इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 5519 (1979): Deviations for untoleranced dimensions and mass of grey iron castings [MTD 6: Pig iron and Cast Iron]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

Indian Standard

DEVIATIONS FOR UNTOLERANCED DIMENSIONS AND MASS OF GREY IRON CASTINGS

(First Revision)

Third Reprint MARCH 1998

UDC 669.131.6 — 14 : 621.753.1

© *Copyright* 1979

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3 *November* 1979

Indian Standard

DEVIATIONS FOR UNTOLERANCED DIMENSIONS AND MASS OF GREY IRON CASTINGS

(First Revision)

Cast Iron and Malleable Cast Iron Sectional Committee, SMDC 9

Chairman	*Representing*
Dr Pranlal Patel	Malleable Iron & Steel Castings Co Pvt Ltd, Bombay
Members	
Shri R. M. Balani	Directorate General of Technical Development, New Delhi
Shri T. R. Mohan Rao (*Alternate*)	
Shri E. L. Barui	National Test House, Calcutta
Shri S. Chandra	Indian Register of Shipping, Bombay
Shri D. G. Dodhia	Shah Malleable Castings Ltd, Thane
Shri K. S. Garg	Electrosteel Castings Ltd, Calcutta
Shri S. N. Agrawal (*Alternate*)	
Shri Govind Singh	Greysham & Co, Delhi
Shri F. S. Katpitia	Jyoti Ltd, Vadodara
Shri M. R. Shah (*Alternate*)	
Shri K. S. Lal	Indian Iron & Steel Co Ltd, Calcutta
Shri M. K. Ghosh (*Alternate*)	
Shri R. N. Mukherjee	Steel Authority of India Ltd (Bokaro Steel Plant), Bokaro
Shri A. K. Awasthi (*Alternate*)	
Cdr K. R. Nair	Pioneer Equipment Co Pvt Ltd, Vadodara
Shri G. N. Pandey	Oil & Natural Gas Commission, Dehra Dun
Shri R. A. Panduranga	Best & Crompton Engineering Ltd, Madras
Shri M. Bapujee (*Alternate*)	
Dr P. S. Pattihal	Tata Engineering & Locomotive Co Ltd, Jamshedpur
Shri B. K. Giri (*Alternate*)	
Representative	Steel Authority of India Ltd (R & D), Centre for Iron & Steel, Ranchi
Shri B. G. Sastry	Ductron Castings Ltd, Hyderabad
Shri M. S. Dalvi (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1979
BUREAU OF INDIAN STANDARDS
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Senior Chemist & Metallurgist, Chittaranjan Locomotive Works, Chittaranjan	Ministry of Railways
Deputy Director (Met)-I, Research, Design & Standards Organization, Lucknow (*Alternate*)	
Shri C. S. S. Setty	Ennore Foundries Ltd, Madras
Shri T. S. Venkoba Rao (*Alternate*)	
Shri J. N. Sharma	Heavy Engineering Corporation Ltd, Ranchi
Shri T N. Tandon (*Alternate*)	
Shri P. J. Shenoy	Kesoram Spun Pipes & Foundries, Calcutta
Shri S. C. Narsaria (*Alternate*)	
Shri M. P. Singh	Ministry of Defence (DGOF)
Shri R. K. Sinha	Fertilizer Corporation of India Ltd, Sindri
Shri D. Srinivasan	Joint Plant Committee, Calcutta
Shri B. P. Ghosh (*Alternate*)	
Shri A. Srinivasulu	Bharat Heavy Electricals Ltd
Shri A. K. Mittal (*Alternate* I)	
Shri A. Somasundaram (*Alternate* II)	
Shri N. S. Swaminathan	Tractors and Farm Equipment Ltd, Madras
Shri S. Natesan (*Alternate*)	
Shri K. M. Taneja	Directorate General of Supplies & Disposals (Inspection Wing)
Shri M. C. Aich (*Alternate*)	
Dr J. K. Tiwary	National Metallurgical Laboratory (CSIR), Jamshedpur
Shri C. R. Rama Rao, Director (Struc & Met)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri Shanti Swarup
Deputy Director (Metals), ISI

Indian Standard

DEVIATIONS FOR UNTOLERANCED DIMENSIONS AND MASS OF GREY IRON CASTINGS

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 3 September 1979, after the draft finalized by the Cast Iron and Malleable Cast Iron Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first issued in 1969. While reviewing this standard, in the light of experience gained during these years, the Committee felt to revise this standard taking note of the present practices being followed in the country in this field. Typical illustrations depicting the nominal and overall dimensions have also been specified.

0.3 The main object of this standard is to facilitate the producers as well as the users of grey iron castings to improve and simplify their production and distribution, to eliminate waste of time and material involved in production and to set up standards of quality and dimensions. It is hoped that this standard will satisfy a long felt need by simplifying the application of agreed limits to drawings.

0.4 Normally tolerances are specified for all important dimensions on the engineering drawings. The deviations specified in this standard relate to untoleranced dimensions of unmachined sand castings. Further machining allowances are to be added for outside dimensions and subtracted for internal dimensions. These machining allowances should not be less than the minimum machining depth necessary, plus the negative deviations in the case of outside dimensions and the positive deviations in the case of internal dimensions.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained

---

*Rules for rounding off numerical values (*revised*).

in the rounded off value should be the same as that of the specified value in this standard.

---

1. SCOPE

1.1 This standard covers deviation for untoleranced dimensions of grey iron castings and deals with three classes of deviations.

1.2 The class of deviations applicable shall be mutually agreed upon between the purchaser and the manufacturer at the time of enquiry and order.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Dimensions

2.1.1 *Nominal Dimensions* — The dimension prescribed on the production drawing to which deviation is to be applied (*see* Appendix A).

2.1.1.1 If the surfaces influencing this dimension are not provided with machining allowances, the nominal dimension of the final casting is the dimension specified in the drawing.

2.1.1.2 If the surfaces influencing this dimension have machining allowance, then the nominal dimension on a casting is equal to the total of the nomial dimension given in the machined casting drawing and the relevant maching allowances.

2.1.2 *Overall Dimensions* — The largest measurable dimension of a casting on particular part of the casting in which the nominal dimension is located (*see* Appendix A).

2.2 Permissible Deviations

2.2.1 Positive deviation is the difference between the maximum permissible dimension and the nominal dimension.

2.2.2 Negative deviation is the difference between the minimum permissible dimension and the nominal dimension.

3. PERMISSIBLE DEVIATIONS ON DIMENSIONS

3.1 Length, Width and Height — The deviations on untoleranced dimensions of grey iron castings shall be as given in Tables 1, 2 and 3.

3.2 Wall Thickness — The deviations on untoleranced wall thickness of grey iron castings shall be as given in Table 4.

TABLE 1 PERMISSIBLE DEVIATIONS ON UNTOLERANCED DIMENSIONS OF GREY IRON CASTINGS, CLASS 1

(*Clauses* 3.1 *and* 3.3)

All dimensions in millimetres.

MAXIMUM OVERALL DIMENSION OF CASTING	NOMINAL DIMENSION									
	Up to 6	Over 6 to 10	Over 10 to 18	Over 18 to 30	Over 30 to 80	Over 80 to 180	Over 180 to 315	Over 315 to 500	Over 500 to 800	Over 800 to 1 250
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	±	±	±	±	±	±	±	±	±	±
Up to 18	0·5	0·5	0·5	—	—	—	—	—	—	—
Over 18 to 30	0·5	0·5	0·6	0·8	—	—	—	—	—	—
Over 30 ,, 80	0·5	0·5	0·8	1·0	1·2	—	—	—	—	—
Over 80 ,, 180	0·6	0·6	1·0	1·2	1·5	1·5	—	—	—	—
Over 180 ,, 315	0·8	1·0	1·2	1·5	1·5	2·0	2·0	—	—	—
Over 315 ,, 500	1·0	1·2	1·2	1·5	2·0	2·0	2·5	2·5	—	—
Over 500 ,, 800	1·2	1·5	1·5	2·0	2·0	2·5	2·5	2·5	3·0	—
Over 800 ,, 1 250	1·5	2·0	2·0	2·5	2·5	2·5	2·5	3·0	3·0	3·5

TABLE 2 PERMISSIBLE DEVIATIONS ON UNTOLERANCED DIMENSIONS OF GREY IRON CASTINGS, CLASS 2

(*Clauses* 3.1 *and* 3.3)

All dimensions in millimetres.

MAXIMUM OVERALL DIMENSION OF CASTING	NOMINAL DIMENSION													
	Up to 6	Over 6 to 10	Over 10 to 18	Over 18 to 30	Over 30 to 80	Over 80 to 180	Over 180 to 315	Over 315 to 500	Over 500 to 800	Over 800 to 1 250	Over 1 250 to 2 000	Over 2 000 to 3 150	Over 3 150 to 5 000	Over 5 000 to 8 000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	±	±	±	±	±	±	±	±	±	±	±	±	±	±
Up to 18	0·6	0·8	0·8	—	—	—	—	—	—	—	—	—	—	—
Over 18 to 30	0·8	0·8	1·0	1·2	—	—	—	—	—	—	—	—	—	—
Over 30 ,, 80	0·8	0·8	1·2	1·5	1·5	—	—	—	—	—	—	—	—	—
Over 80 ,, 180	0·8	1·0	1·5	1·5	2·0	2·5	—	—	—	—	—	—	—	—
Over 180 ,, 315	1·0	1·5	1·5	2·0	3·0	3·0	3·0	—	—	—	—	—	—	—
Over 315 ,, 500	1·5	1·5	2·0	2·5	3·5	3·5	3·5	4·0	—	—	—	—	—	—
Over 500 ,, 800	1·5	2·0	2·5	3·5	4·0	4·0	4·0	4·5	5·0	—	—	—	—	—
Over 800 ,, 1 250	2·0	2·5	3·5	4·0	4·5	4·5	4·5	5·0	5·0	5·5	—	—	—	—
Over 1 250 ,, 2 000	2·5	3·5	4·0	4·5	5·0	5·0	5·0	5·0	5·5	6·0	7·0	—	—	—
Over 2 000 ,, 3 150	3·0	3·5	4·0	5·0	5·0	5·0	5·5	6·0	6·0	6·0	7·0	8·0	—	—
Over 3 150 ,, 5 000	4·0	4·0	5·0	5·0	5·0	5·5	6·0	6·0	6·0	7·0	8·0	9·0	10	—
Over 5 000 ,, 8 000	4·0	5·0	5·0	5·0	5·0	6·0	6·5	7·0	7·0	8·0	9·0	10	11	12

TABLE 3 PERMISSIBLE DEVIATIONS ON UNTOLERANCED DIMENSIONS OF GREY IRON CASTINGS, CLASS 3

(*Clauses* 3.1 *and* 3.3)

All dimensions in millimetres.

Maximum Overall Dimension of Casting	Nominal Dimension														
	Up to 6	Over 6 to 10	Over 10 to 18	Over 18 to 30	Over 30 to 80	Over 80 to 180	Over 180 to 315	Over 315 to 500	Over 500 to 800	Over 800 to 1 250	Over 1 250 to 2 000	Over 2 000 to 3 150	Over 3 150 to 5 000	Over 5 000 to 8 000	Over 8 000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±
Up to 18	0·8	1·0	1·0	—	—	—	—	—	—	—	—	—	—	—	—
Over 18 to 30	1·0	1·0	1·2	1·5	—	—	—	—	—	—	—	—	—	—	—
Over 30 ,, 80	1·2	1·2	1·5	2·0	2·5	—	—	—	—	—	—	—	—	—	—
Over 80 ,, 180	1·2	1·5	2·0	2·5	3·0	3·5	—	—	—	—	—	—	—	—	—
Over 180 ,, 315	1·5	2·0	2·5	3·0	3·5	4·0	4·5	—	—	—	—	—	—	—	—
Over 315 ,, 500	2·0	2·5	3·5	4·0	4·0	5·0	5·0	6·0	—	—	—	—	—	—	—
Over 500 ,, 800	2·5	3·5	4·0	5·0	5·0	6·0	6·0	7·0	7·0	—	—	—	—	—	—
Over 800 ,, 1 250	3·5	4·0	5·0	6·0	6·0	7·0	7·0	8·0	8·0	9·0	—	—	—	—	—
Over 1 250 ,, 2 000	4·0	5·0	6·0	7·0	8·0	8·0	8·0	8·0	9·0	9·0	10·0	—	—	—	—
Over 2 000 ,, 3 150	5·0	6·0	6·0	7·0	8·0	8·0	9·0	9·0	10·0	10·0	11·0	12·0	—	—	—
Over 3 150 ,, 5 000	6·0	6·0	7·0	8·0	9·0	9·0	10	10	11·0	11·0	12·0	13·0	15·0	—	—
Over 5 000 ,, 8 000	7·0	7·0	8·0	9·0	10	10	11	11	12	12	12	14	16	18	—
Over 8 000	7·0	8·0	9·0	10	10	11	11	12	12	12	14	16	18	19	20

TABLE 4 PERMISSIBLE DEVIATIONS ON UNTOLERANCED WALL THICKNESS OF GREY IRON CASTINGS

(*Clauses* 3.2 *and* 3.2.1)

All dimensions in millimetres.

MAXIMUM OVERALL DIMENSION OF CASTING (1)	THICKNESS OF CASTING (2)	PERMISSIBLE DEVIATION	
		Class 1 (3)	Classes 2 and 3 (4)
		±	±
Up to 500	Up to 10	0·8	1·0
	Over 10 to 30	1·0	1·5
	Over 30 ,, 50	1·5	2·0
	Over 50 ,, 80	2·0	2·5
	Over 80 ,, 120	2·5	3·0
Over 500 to 1 250	Up to 10	1·0	1·5
	Over 10 to 30	1·5	2·0
	Over 30 ,, 50	2·0	2·5
	Over 50 ,, 80	2·5	3·0
	Over 80 ,, 120	3·0	3·5
Over 1 250 to 2 000	Up to 18	2·0	2·5
	Over 18 to 30	2·5	3·0
	Over 30 ,, 50	3·0	3·5
	Over 50 ,, 80	3·5	4·0
	Over 80 ,, 120	4·0	4·5
Over 2 000 to 4 000	Up to 18	2·0	2·5
	Over 18 to 30	2·5	3·0
	Over 30 ,, 50	3·0	3·5
	Over 50 ,, 80	3·5	4·0
	Over 80 ,, 120	4·0	4·5
Over 4 000	Up to 18	2·0	2·5
	Over 18 to 30	2·5	3·0
	Over 30 ,, 50	3·5	4·0
	Over 50 ,, 80	4·0	5·0
	Over 80 ,, 120	4·5	6·0

3.2.1 The deviations given in Table 4 do not include the foundry taper which is decided by the manufacturer.

3.3 Diameter and Roundings — For the outside and inside diameters and also the roundings (outside and inside radii), the deviations given in Tables 1, 2 and 3 shall apply. For reasons of casting technique, the designer should consider the minimum dimensions specified in Table 5 for inside rounding. If the actual radii fall short of minimum dimensions mentioned in Table 5, the manufacturer may use his discretion to increase the diameter of roundings appropriately to avoid cracking.

TABLE 5 CORNER RADII

All dimensions in millimetres.

	Nominal Wall Thickness								
	Up to 30	Over 30 to 50	Over 50 to 80	Over 80 to 120	Over 120 to 180	Over 180 to 250	Over 250 to 315	Over 315 to 400	Over 400 to 500
Corner radii (inside), minimum values	10	15	20	30	50	70	90	120	150

3.4 Centre-to-Centre Distance Between Cored Holes, Bosses, etc — The deviations on untoleranced dimensions shall be as follows:

Nominal dimensions, mm	Up to 30	Over 30 to 180	Over 180 to 500	Over 500 to 800	Over 800
Deviation, mm	± 0·6	± 1	± 2	± 3	± 4

3.5 Mass of Castings — The upper limits of deviation on untoleranced mass of castings shall be as given in Table 6.

TABLE 6 DEVIATIONS IN MASS OF GREY IRON CASTINGS

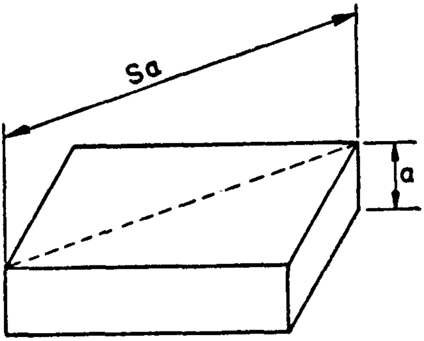
Nominal Mass of Casting, kg	Permissible Deviation in Mass (Percent)		
	Class 1	Class 2	Class 3
Up to 100	5	8	10
Over 100 to 1 000	4	6	10
Over 1 000	3	5	8

3.5.1 Lower deviations on mass shall be permitted only where the dimensions have negative deviations.

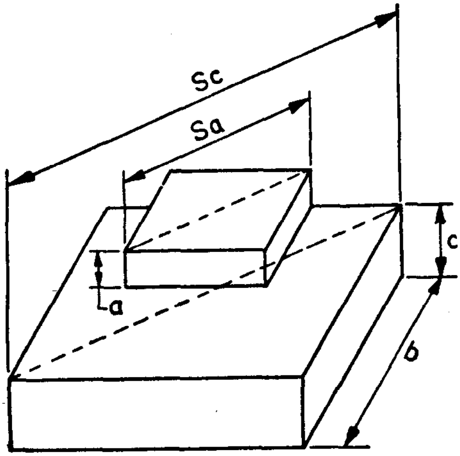
APPENDIX A

(*Clauses* 2.1.1 *and* 2.1.2)

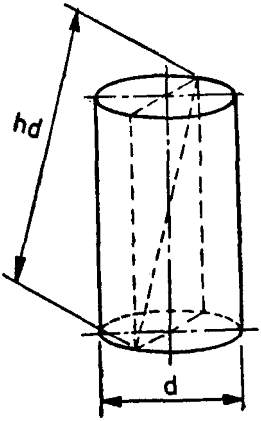
TYPICAL ILLUSTRATIONS DEPICTING THE NOMINAL AND OVERALL DIMENSIONS



If the nominal dimension is '*a*' the overall dimension is '*Sa*' being the corresponding largest dimension.



If the nominal dimension is '*a*' the overall dimension is '*Sa*'. For the nominal dimension '*c*' the overall dimension is '*Sc*'. For the nominal dimension '*b*' the overall dimension is '*Sc*'.



For the nominal dimension '*d*' the overall dimension is '*hd*'. For the nominal dimension '*hd*' the overall dimension is also '*hd*'.

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

Central Laboratory :	Telephone
Plot No. 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010	8-77 00 32
Regional Offices:	
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	337 86 62
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	235 23 15
†Western : Manakalaya, E9, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	832 92 95
Branch Offices::	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	550 13 48
‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	839 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001	40 36 27
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037	21 01 41
Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001	8-28 88 01
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No.29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	54 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	20 10 83
E-52, Chitaranjan Marg, C- Scheme, JAIPUR 302001	37 29 25
117/418 B, Sarvodaya Nagar, KANPUR 208005	21 68 76
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	23 89 23
NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010	52 51 71
Patliputra Industrial Estate, PATNA 800013	26 23 05
Institution of Engineers (India) Building 1332 Shivaji Nagar, PUNE 411005	32 36 35
T.C. No. 14/1421, University P. O. Palayam, THIRUVANANTHAPURAM 695034	6 21 17

---

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, CALCUTTA 700072	27 10 85
†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	309 65 28
‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square, BANGALORE 560002	222 39 71

Reprography Unit, BIS, New Delhi, India